



**MUNICIPAL REGULATION OF HAZARDOUS
MATERIALS DUE TO THE THREAT OF TERRORISM
AND ITS EFFECT ON THE RAIL INDUSTRY**

GRADUATE RESEARCH PROJECT

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AFIT/ILM/ENS/06-12

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GRADUATE RESEARCH PROJECT

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Abstract

Hazardous materials transport and regulation is coming under severe scrutiny in response to terrorism concerns following the events of September 11, 2001. This increased scrutiny, combined with a lack of a coherent protection strategy from either the Department of Transportation or the Department of Homeland Security, has led municipalities to begin to regulate the shipment of hazardous materials. In February 2005, Washington DC signed into law the Terrorism Prevention in Hazardous Materials Transportation Emergency Act, effectively banning the transportation of ultra-hazardous materials through the city. Municipal reaction to the actions taken by District of Columbia has been varied and widespread. Using both a meta-analysis and a case study methodology, this project analyzes the impacts of the current terrorist environment in an attempt to determine the potential of additional municipal regulation of hazardous materials transportation via rail. Since the case study methodology did not result in any direct data, the research team applied the meta-analysis technique to answer the research and investigative questions through the literature review. The data gained through this study allowed the research team to discover the following findings: there has been limited governmental reaction to terrorism within the rail regulations; the effects of HM-223 are undetermined; the Washington D.C. case, if upheld, will adversely affect the rail industry; and most cities have reactive policies toward HAZMAT rail movement.

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I. Introduction

Problem Statement

With all of the levels of regulation in place associated with hazardous materials transport, it is increasingly difficult for transporters to remain informed and up-to-date on the latest requirements. Supply chain managers and logistics personnel need to know if the potential exists for increased regulation of hazardous material transportation, over and above what is already mandated by the federal government. By identifying the differences since September 11 2001, as well as exploring to what extent the cities are increasing their roles in hazardous transportation regulation policies; this research seeks to assist those personnel in achieving their supply chain and transportation objectives.

Background

According to the US Department of Transportation (DOT), average daily hazardous materials transactions exceed 800,000 shipments, and rail alone carries 1.8 million carloads of hazardous materials each year (AAR, 2006). Annual tonnage for hazardous materials is expected to grow at a yearly rate of two percent over the next five years. Hazardous materials transport within the trucking and rail industries represents only a fraction of the overall tonnage percentage, but these shipments and the routing corridors and regulations governing them are coming under severe scrutiny in response to terrorism concerns following the events of September 11, 2001.

The Code of Federal Regulations section 49 contains regulations that address the broad transportation industry, but it wasn't until 1966, when the DOT was established to

assume the regulation of hazardous materials from the Bureau of Explosives, that hazardous materials transport was specifically broken out from these broad rules. The fallout of September 11th created the Department of Homeland Security (DHS) and many of DOT's policies and definitions regarding hazardous materials, their transport, and federal regulation jurisdictions fell under scrutiny of the DHS. To further complicate matters, laws such as HM-223 were enacted. In its final rule on HM-223, published in the Federal Register on October 30, 2003, the DOT redefined transportation to exclude portions of tank car loading, unloading, and temporary storage. This redefinition presents an opportunity for state and local officials to begin to issue regulations of the type that have previously been preempted.

The apparent gap in coverage created by HM-223 combined with a lack of a coherent protection strategy from either the DOT or DHS, has led municipalities to begin to regulate the shipment of hazardous materials. In February 2005, Washington DC signed into law the Terrorism Prevention in Hazardous Materials Transportation Emergency Act, effectively banning the transportation of some ultra-hazardous materials through the city. In addition, the initial federal court ruling said that the District of Columbia is entitled to take steps to protect itself from a catastrophic accident because the federal government has failed to. Municipal reaction to the actions taken by District of Columbia has been varied and widespread.

The American Association of Railroads reports that Atlanta, Baltimore, Boston, Cleveland, Chicago, Cincinnati, Philadelphia, Pittsburgh, and the entire state of California are also looking to ban hazmat transportation (AAR, 2006; Johnson, 2005). New York City has gone as far as to legislate a restriction of hazmat rail operation into

the city, mandating that it must arrive via truck (Kerstein, 2005). The proposed Baltimore law goes even beyond the New York legislation in that the Baltimore case wouldn't even allow trucks to bring these materials into Baltimore's "hazmat zone". This zone is defined as "all points within the geographic boundaries of Baltimore City" that can be shipped by "an alternative route" (Janis, 2005). Meanwhile, other cities are content to sit on the sidelines and wait for either the courts to have a final ruling on the District of Columbia case, or for the DOT/DHS to provide an overarching plan for hazardous materials security. There is an absence of research with regards to municipal regulations as it applies to hazardous transportation, but recent trends suggest these regulations are becoming increasingly complex and stringent following the events of September 11, 2001.

Scope

Research Question.

So what is the status of the current environment, and what is possible for the immediate future? Is the country to be soon faced with regulation purgatory or excessive over-regulation? With that in mind this research seeks to answer the question: Has the current terrorist environment increased regulatory issues with regard to hazardous materials transportation via rail?

Investigative Questions.

As a country, we had not seen the effects of terrorist action on native soil until September 11, 2001. Therefore, in order to address the current terrorist environment the research team thought it prudent for the first investigative question to be:

1. Has there been increased regulation regarding the transportation of hazardous materials by rail since 9/11?

In an attempt to reveal the lack of a comprehensive hazardous material policy created by a responsibility gap between DOT and DHS, and the effects that policy gap might have had upon the municipalities, the research team decided to ask:

2. Has there been increased regulation regarding the transportation of hazardous by rail materials as a result of HM-223?

Finally, the team seeks to assess the shockwaves felt by the cities with regard to the Washington DC case, and if it would provide them the impetus they lacked to protect their constituents, by asking:

3. Has there been increased regulation regarding the transportation of hazardous materials by rail as a result of the “The Terrorism Prevention in Hazardous Materials Transportation Emergency Act of 2005,” enacted by the District of Columbia?

The research team feels that each question provides a building block approach to accurately assess the cities potential for regulation, as well as providing important support to answer the research question.

Proposed Methodology

This research uses both a meta-analysis and a case study methodology. Upon review of the existing literature the research team will make an initial analysis of the increasing amount of federal, state and city regulation on the rail transportation community due to homeland security. Next, the potential for cities to enact additional

legislation in the future will be attained by interviewing several Class I railroad companies as well as ten city hazardous material managers. Finally, the qualitative case study approach is used to identify patterns in cities that have either enacted or plan to enact legislation to protect their constituencies from the threat of hazardous materials, and assess the potential impact on the rail industry.

Limitations and Assumptions.

The scope of this research is centered on the rail industry. Rail transportation will be discussed regarding recent regulation attempts to re-route hazardous cargo in certain metropolitan areas. Comparison of municipal regulations will be limited to the United States. International transportation across Mexican and Canadian borders will not be included in the scope of this research. An apparent limitation of this research is the lack of previous research in this area, the lack of documented municipal points of contact for enacting legislation, and the lack of consistent municipal points of contact for dealing with the transportation of hazardous materials. Furthermore, the team assumes that this research will be generalizable to the rest of the municipalities across the United States.

Summary

In this chapter the research team has introduced the research topic by giving a brief overview of the background of the problem. In addition, the team then provided the research question and supporting investigating questions, along with the proposed methodology and limitations. The next chapter will consist of a review of the existing literature, and provide a more detailed picture of the landscape of hazardous materials rail transportation.

II Literature Review

Industry Security Background

When compared to the magnitude of the consequences of HAZMAT transportation accidents in major cities, there has been surprisingly little research on the effects of HAZMAT legislation on the transportation and/or supply chain management systems. This paper will synopsise the available literature concerning supply chain management effects, rail industry security, government reactions to HAZMAT potential accidents, accidents and solutions, HM-223 cases and reaction, Washington D.C. case legislation, and finally the government and industry reaction to the D.C. case. Upon completion, this literature review should provide a complete overview of the available literature.

As manufacturing firms move toward a Just-In-Time (JIT) philosophy, in order to minimize inventory carrying costs, the efficiency of the supply chain transportation system can not be over-emphasized. Terrorist activity that hampers, or stops, a JIT transportation system can shut down an entire manufacturing line. Some firms have started to maintain a “Strategic Emergency Stock” to help mitigate the risks associated with such an attack on the transportation network (Sheffi, 2001). Sheffi also identified 4 challenges to supply chain management under the threat of a terrorist attack on the transportation network:

- (1) Preparing for an attack and operations in the aftermath of such attack
- (2) Managing uncertainty in the supply chain system due to possible attacks
- (3) Managing relationships with Government entities

(4) Organizing the supply chain to meet such challenges.

In addition to managing relationships with Government entities, Russell and Saldanha (2003) have identified four other tenets of Security-aware logistics networks:

- (1) Know and secure overseas trading partner's supply chains
- (2) Prepare to mode-shift in emergencies
- (3) Develop communication channels to manage crisis
- (4) Develop agility, reservists, and pre-positioning of supply chains

These challenges and tenets to the supply chain must be tackled with a philosophy of quality management. The quality management of the supply chain transportation system will allow visibility, control and anti-tampering practices to become by-products of proper management versus non-value added activities (Lee and Wolfe, 2003). Russell and Saldanha have identified that non-value added increased security to meet this new threat has a total cost of \$151 billion across the entire economy (2003). \$65 billion of this cost is due to increases in supply chain security (Russell and Saldanha, 2003). In this new era of quality-management security of the transportation supply chain, screening cargo in transport should be the last resort. Supply chain systems should be developed to secure cargo at origin and ensure security during transportation (Lee and Wolfe, 2003). This "secure transportation" philosophy would be focused to keep all modes of transportation, to include rail cargo, from becoming mobile weapons of mass destruction.

With over 1.8 million carloads of hazmat transported yearly, the Association of American Railroads (AAR) reports that the rail industry is one of the safest ways to transport hazardous material. The GAO states that these 1.8 million carloads equates to more than 3 billion tons of hazmat shipments (GAO-06-471). Even though truck and rail

generate equal hazmat ton-mileage, an accident involving hazmat release is 16 times more likely to occur during transportation via truck (AAR, 2006). Hazardous material incidents declined from 1,128 occurrences in 1992 to only 894 in 2001. This accounts for only 7 percent of hazardous incidents in all modes (GAO-03-435). From 1997 to 2001 the rail industry had less than 1 serious incident per million tons of hazardous material shipment (GAO-03-435). (Note: The GAO report did not define “serious” incident.) In 2004, 99.997 percent of these carloads reached their final destination without accidental release and the rail industry reduced hazmat accident rate by 89 percent between 1980 and 2004 and 40 percent from 1990 to 2004 (AAR, 2006). The AAR also reported that hazmat transportation only accounts for 5 percent of US freight rail, 5 percent of the rail tonnage, and 6 percent of the ton-miles; additionally, within the movement of hazmat material 68 percent of the hazmat material travels in tank cars while 28 percent move on inter-modal flat cars. The AAR also reported that almost all inhalation hazards are moved via tank cars (AAR, 2006).

Integral to the success of hazmat movement is proactive work by the rail industry. The following are some key safety programs instituted by the rail industry (AAR, 2006):

- (1) the development of a priority based plan to enhance freight security known as the Terrorism Risk Analysis and Security Management Plan
- (2) a 24/7 resource center to coordinate and communicate critical information for emergency responders
- (3) many research and development efforts to increase tank car safety
- (4) special restrictions already levied on specific chemicals

Government Opinion of Security Concerns

With over 100,000 miles of track in the United States the rail industry, as part of the overall transportation system, is classified as a critical infrastructure. As per the USA PATRIOT Act a critical infrastructure is defined as “systems and assets, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economy security, national public health or safety, or combination of those matters” (GAO-03-843). The same GAO report found that due to the openness of the freight rail yards, the extensiveness of the system, the sheer volume of freight traffic, and the sluggishness of the economy the rail industry is a prime target for terrorists. GAO-04-598T reported that a Mineta Institute study found that transportation systems world wide were attacked by terrorists 195 times from 1997 through 2000. The current security culture also puts further stress on the rail industry. Amtrak estimated it spends almost \$500,000 per month for increased personnel during heightened national threat conditions (GAO-03-843; GAO-04-598T). Adding to the dilemma of rail hazmat security is the fact that many shipments of hazardous material go undeclared. In 2005 the DOT found approximately 1,000 shipments of unreported hazardous material. Neither DHS nor DOT could provide data on the estimate of the total amount of undeclared shipments entering the United States (GAO-06-417).

Although the rail industry states the safety record of hazmat rail transportation, others disagree concerning rail safety. The Naval Research Laboratory has estimated that a successful terrorist attack on a 90-ton rail Chlorine tanker in a major city could kill 100,000 people in less than 30 minutes (Unruh, 2005). Senator Joseph Biden (D-DE) has compared this type of attack to a “rolling weapon of mass destruction” (Unruh, 2005).

Senator Charles E. Schumer (D-NY) further stated that the Federal Government is “asleep at the switch when it comes to freight train safety” and that terrorists could exploit this fact (Schumer, 2005). Rep. Edward Markey (D-MA) stated, “Every, day, disastrous mobile bombs travel at top speeds through densely populated communities across the country. It would take very little for terrorists to turn these transport shipments into an explosive nightmare that could harm hundreds of thousands of people,” (D’Amico, 2005).

After the attacks of September 11, the rail industry took proactive acts to increase rail safety. Instrumental to this increase in safety was the assessment of facilities, their exposure to attack, and the development of a security plan to address the facility risks (GAO-03-435). Prior to September 11, rail security focused on theft; now the rail industries security plan has four alert levels that focus on infrastructure, military operations, information technology and communications, security of operations, and hazardous materials (GAO-03-435).

The GAO report found that the rail security system’s linchpin is the vigilance of their employees (GAO-03-435). Although the rail industry states that their employees receive extensive training; others disagree. Teamsters President, James Hoffa, stated that “on a very basic level, rail employees are still in the dark about how to evacuate their trains” (D’Amico, 2006). On rail employee training, Rep. Stephen Lynch (D-MA) has stated “Our rail workers haven’t received terrorism prevention and response training, and we are wholly unprepared to prevent and respond to a terrorist attack or disaster on the rails” (D’Amico, 2006).

Complicating the issues of rail legislation is a debate as to who should control the rail industry in regards to security; Department of Homeland Security (DHS), Department of Transportation (DOT), or the Transportation Security Administration (TSA). The TSA, once part of the DOT, is responsible for all transportation modes and is now part of DHS. However, the Federal Railroad Administration (FRA) remained within DOT and promotes and enforces rail safety. Also remaining within DOT is the Research and Special Programs Administration (RSPA), now known as the Pipeline and Hazardous Materials Safety Administration (PHMSA), which regulates transportation of material posing a risk to health, safety and property (GAO-03-435; D'Amico 2006). Adding to this morass of regulatory bodies the Nuclear Regulatory Commission (NRC), Department of Energy (DOE), Department of Defense (DOD), Environmental Protection Agency (EPA), Department of Labor's Occupational Safety and Health Administration, and the Directorate of Emergency Preparedness and Response may all have some regulatory responsibility for hazardous transportation via rail (GAO-03-435).

As early as June 2003 the GAO started to recommend that the Secretary of Transportation and Secretary of Homeland Security develop a memorandum of agreement to clarify and delineate roles and responsibilities (GAO-03-843). However; DOT and DHS state that the Aviation and Transportation Security Act specifically gives TSA the primary responsibility for transportation modal security. This act, according to the GAO, did not relieve DOT from modal security and the Homeland Security Act of 2002 specifically designated the Secretary of Transportation as the responsible agent for security and safety of rail and hazardous material transportation via any mode (GAO-03-843). In March 2003 TSA stated that they had not developed a security plan for rail, but

they, in conjunction with other DHS agencies, were developing a national transportation security plan to address all modes of transportation. Time frames for this plan have not been established (GAO-03-435). The GAO report states that any such national plan would need to be based on a risk management approach which focuses on (1) threat assessment (2) vulnerability assessment to weaknesses and (3) evaluate and identify assets and infrastructure as to their importance to safety and the economy (GAO-03-435). This GAO report further states that such a national plan needs to address safeguards for hazardous materials in stored rail cars awaiting transportation and to identify the requirement for companies to notify local communities of the type and quantity of hazardous materials being transported through cities.

Several Bills are currently in Congress to address rail safety. A bill proposed in November 2005 by Rep. Stephen Lynch (D-MA) required DHS to consult with DOT, rail labor unions, public safety officials, and other railroad groups on the following: (1) a DHS approved rail worker emergency training program (2) DHS development of rail yard monitoring guidelines (3) rail implementation of the DHS requirements within 1 year and (4) a requirement for DHS to identify rail companies who do not comply with the act by letters of noncompliance in the Federal Register. This bill requires appropriation of an estimated \$100 million (D'Amico, 2006). Another bill introduced by Rep. Edward Markey (D-Mass) will force the DOT to reroute hazardous wastes around "areas of concern" (Snyder, 2005).

Additionally, a study conducted by Senator Joseph Biden (D-DE) states that the Federal Railroad Administration (FRA) currently does not have enough authority, nor does the administration use the authority it currently has. The study showed that

although the FRA can fine the industry up to \$11,000 per violation, the average fine was only \$2,133 per violation. During 2003, CSX generated revenue in excess of \$6.2 Billion but was only fined an average of \$1 million a year. Schumer's proposed legislation gives the FRA more power and teeth to investigate and prosecute freight rail companies. Since the study found that half of the 60,000 hazmat rail cars were not up to current code, it proposes a strict 15-year age limit on Hazmat rail cars. The legislation also proposes doubling the number of FRA inspectors, and conducting a full FRA investigation of the rail industry safety practices (Schumer, 2005).

Biden's study spurred one of the most comprehensive bills to address the rail security concern; Senator Biden's (D-DE) Hazardous Materials Vulnerability Reduction Act of 2005. The goal of this Act is to provide a "unified, national policy related to the transport of these dangerous chemicals." Introduced 16 June 2005 the bill includes:

- (1) re-routing extremely hazardous materials from high threat corridors
- (2) notification to local officials of the type and quantities of chemicals to be shipped through their areas
- (3) research and development initiatives to study security measures
- (4) \$100 million for training of rail workers and emergency services personnel

In regards to the re-routing strategy, Senator Biden is quoted as follows: "Re-routing is the best way to eliminate the threat of a terrorist attack on chemical cars, and because we are only requiring re-routing for less than 5% of all hazardous materials shipped by rail, it doesn't seem to me to be too much to ask" (Unruh, 2005).

Accident Overview

The March 2004 Madrid commuter train bombings marked the first large-scale terrorist attack on the rail industry in the West. This attack, coupled with the London bombings, forced the United States to move its attention from the aviation industry to rail bombings for the first time since 9/11 (Keane, 2005a). Rep. Stephen Lynch (D-MA) noted that the US has spent 60 times more dollars on the airline security over rail security (D'Amico, 2006). Over \$18.1 billion in federal security funding has been spent on airline security, according to the American Public Transportation Association, while public transportation overall has only received \$250 million over the same timeframe (Keane, 2005a).

Several rail accidents involving hazardous material have spurred the public concern over hazmat transport through major cities. During a July 2001 hazmat incident, the Howard Street Tunnel in Baltimore Maryland was shut down for several days as crews tried to stop the fire and clean up thousands of gallons of hydrochloric acid, tripropylene, and hydrofluoric acid (Associated Press, 2001). In March 2005 a leaking rail car outside Salt Lake City, containing a misidentified mix of hazardous waste acid and ammonia, caused the evacuation of over 8,000 people (Johnson, 2005). These leaks add considerable strength to the opposition of a Government plan to ship, from all parts of the country, 70,000 tons of nuclear waste to a depository in Yucca Mountain, 90 miles from Las Vegas (Associated Press, 2001; GAO-03-435).

In January 2005, a train accident, the result of a failure to reset a manual switch, resulted in the nation's worst chemical accident since 1978. The accident, in Graniteville South Carolina, accounted for nine deaths and 250 injuries. Causing further concern, a

similar accident, in Bieber California, happened 2 days after the South Carolina spill. This second accident caused the evacuation of 5,400 residents (Schumer, 2005). 40 percent of the tracks in the United States still use manual switches. The new Schumer Legislation would change all these manual switches to automatic switches (Schumer, 2005).

In September 2004 two accidents in the same month increased scrutiny on remote control rail operations for Hazmat transportation. On 2 September 2004 a remote control operator was killed during a Hazmat accident at the Northern Santa Fe yard in Clovis NM. Furthermore, on September 21, 2004 four remote controlled cars left the tracks at an East St. Louis rail yard. The incident sickened 75 high school students and caused the evacuation of 140 people (BLET, 2004). The National Transportation Safety Board (NTSB) and the Federal Railroad Administration (FRA) were unaware of the use of remote control operations in these Hazmat situations. The NTSB was also unaware of the connection with remote control operations during a 9 July Hazmat accident in Pine Bluff, Arkansas. The National President of the Brotherhood of Locomotive Engineers and Trainmen, Don Hahs, has stated “How many more derailments, hazmat spills, near misses, and employee fatalities must we endure before the Federal Railroad Administration develops enforceable federal regulations?” (BLET, 2004). Sixty-one communities have asked the FRA to develop remote control safety resolutions. In response, Congressman Gene Green (D-TX) has already proposed legislation, H.R. 5119, to ban the use of remote control operations with railcars transporting Hazmat material (Teamsters, 2004; BLET, 2004).

Security Solutions

The rail industry and the Government are exploring several solutions for rail security after 9/11. As stated by AAR president, Edward Hamberger,

“Some of the actions taken since September 11, include increased cyber security, restricted access to railcar location data, spot employee identification checks, increased tracking and inspection of certain shipments, new encryption technology for selected data communications, increased security at physical assets, and increased employee training to ensure that the industry’s more than 200,000 employees serve as the ‘eyes and ears’ of the security effort” (D’Amico, 2006).

The DHS Secretary Michael Chertoff has stated that many of the initiatives in place deal directly with new technologies and risk assessment (Keane, 2005a). An AAR spokesman stated “We’re actively out there to see what technologies can be brought to bear on our operations, and we’ll continue to do that, working with the federal government and our own experts at the Transportation Technology Center” (Gallagher, 2005). In addition to the CSX-funded “smart technology,” DHS has funded a \$9.8 million pilot study to install “smart” detection technology in 7.5-miles of CSX’s line to automatically detect anomalies and alert first responders (Luczak, 2005). In high-threat areas, DHS is investigating “virtual Gate” technologies. These gates will have sensors to test for chemical release prior to a car entering a yard. These gates will also identify rail-yard intruders via a fixed pan-tilt-zoom camera which would provide a live video feed to Police and other law enforcement agencies (Luczak, 2005). Although promising from a technical standpoint, the economic aspects of these systems make them doubtful. It is estimated that a simple intrusion alarm and closed circuit television system for one portal would cost approximately \$250,000 (GAO-04-598T).

HM-223

RSPA initially released HM-223 on 14 June 2001. The RSPA stated that the rule has four overall goals: (1) maintain nationally uniform standards performed in advance of transportation (2) maintain nationally uniform standards for transportation functions (3) distinguish functions subject to HMR (4) clarify that HMR-regulated functions may also be subject to federal, state, or local regulations (McGuire, 2001).

Somewhat unique to HM-223 final ruling is the controversy over what the ruling doesn't regulate. The final ruling states that transportation ends when the carrier delivers the contents to its final destination. The period of time from the point the carrier delivers the shipment to its destination, but prior to the carriers' departure from the facilities is considered "unloading incidental to movement." This period is covered by HM-223. However; once the carrier leaves the facility, the RSPA considers the rail car unloading operations to be part of the manufacturing process—not transportation. As such, the manufacturing process would be regulated by OSHA, EPA, ATF, or other federal agencies—not DOT (DOT, 2003).

Of major issue since 2003 is the idea of materials called "storage-in-transit." These materials are temporarily stored awaiting delivery to their final destination. According to the HM-223 final ruling, these materials are not subject to the RSPA ruling. HM-223 final ruling specifically states:

"Storage at a shipper facility prior to a carrier exercising control over or taking possession of the hazardous material or storage at a consignee facility after a carrier has delivered the hazardous material is not storage incidental to movement and is not regulated under the HMR (RSPA, 2003)."

There is also current debate as to the level of rail industry notification to local officials when hazardous materials are considered “storage-in-transit” (GAO-03-435). These items stored in transit generally violate a 48-hour rule. This rule requires carriers to move hazmat materials within 48 hours of receipt at any yard. However, even the FRA states that the 48-hour rule was not derived for security measures, but was made to keep oil companies from using rail yards as cheap storage warehouses in the 1900s (GAO-03-435). The RSPA states that this storage-in-transit issue is further confused as to whether the EPA or the DOT has regulatory responsibility. HM-223 specifically states that the DOT does not have regulatory responsibility over material considered “storage-in-transit” (RSPA, 2003).

HM-223 Industry Reaction

The rail industry sees the HM-223 ruling is the newest example of DOT allowing someone else to regulate hazmat transportation. Industry favors DOT taking a more proactive role for two primary reasons. The first is that DOT has more experience and is better suited to understand the culture and economic issues with hazardous material transportation. The second, and more important, reason is that Congress designated DOT with the power to promote national and international uniformity. With this mandate DOT’s laws have the power of preemption. This principle keeps cities from developing a regulatory system that is different from a national regulatory system (Bierlein, 2004). Without this preemption principle the rail industry could be saddled with differing rules from 33,000 jurisdictions in the US (Keane, 2005b).

The National Industrial Transportation League (NITL) appealed the release of HM-223 to the RSPA. In the appeal the NITL stated that the ruling “fails to achieve

certainty, uniformity, and predictability. . .because it creates unpredictable ‘on-again, off-again’ regulation” (Bulk, 2004). NITL further stated that they felt the RSPA misinterpreted the term transportation by looking at it through a segmented, activity-by-activity approach. The NITL felt that the term should be an overall expression from preparation to delivery (Bulk, 2004). The NITL emphasized their concern by stating that the HM-223 would create an unsafe environment across the nation. “Safe transportation can only be met if the activities of each of thousands of persons are coordinated through a nationwide, consistent regulator structure . . . this can only be accomplished through nationwide federal regulation under DOT” (Bulk, 2002).

Key to the debate over HM-223 is the handoff off hazardous rail containers between carriers and shippers. The HM-223 ruling relieves the carrier from HM-223 regulatory guidance once the product is delivered to the yard, but before the shipper unloads the hazardous cargo. This handoff is generally one of the most dangerous periods. In 2004, 65 percent of the over 14,000 hazmat incidents occurred during this unloading phase (Keane, 2005b). The NITL states that the HM-223 ruling should apply to carrier and shipper alike. In fact the NITL states that the shipper is generally the most qualified person to unload/load material, because they are generally the most familiar with the material being shipped (Bulk, 2002). The HM-223 final ruling acknowledges the fact that most of the time, the unloading of hazmat happens after the carrier has left the facility: “in many cases, the rail tank car sits for several days, weeks, or even months prior to commencement of the unloading operation” (RSPA, 2003). The NITL states that the current wording of HM-223 will discourage shipper loading/unloading and therefore increase unsafe operations and accidents (Bulk, 2002).

The National Transportation Safety Board (NTSB) also stresses the dangerous nature of the loading and unloading phase. On 25 February 2003, the NTSB stated that the RSPA's ruling on HM-223 "could have an adverse effect on the safety of loading and unloading operations" (Rosenker, 2004). The statement came on the heels of a 13 September 2002 incident where during the loading of a rail car at the BASF Corporation chemical facility in Freeport Texas the rail car leaked 6,500 gallons of cyclohexanone oxime, water, and cyclohexanone. 28 people received minor injuries and residents within a mile of the facility were evacuated for 5.5 hours (Rosenker, 2004). As a result of this incident, the NTSB issued safety recommendations I-01-2 through I-01-5. These recommendations state that specific written instructions for loading and offloading hazmat material need to be written in coordination with applicable procedures, shippers, consignees, and end-users. The following year the NTSB issued I-02-1 and I-02-2. The first ruling stressed the need for new safety requirements to be written with the EPA and OSHA. The second ruling called for a specific oversight program to ensure compliance with the new requirements (Rosenker, 2004).

Washington D.C. Case

The transportation of hazardous material through the Nation's Capital holds special considerations. Until the introduction of The Terrorism Prevention in Hazardous Materials Transportation Emergency Act of 2005, hazmat transportation through the Capital; as a terrorist target, was not addressed. The congressional representative for the District, the Honorable Eleanor Holmes Norton, stated, that hazmat transportation is the "single greatest unaddressed security threat to the City" (Patterson, 2005). Prior to introduction of the Act, a simulation of a Hazmat incident in the Capital are estimated

over 100,000 casualties in the first 30 minutes, and an economic impact of over \$5 Billion. Upon introduction of the Act, Councilwoman Patterson stressed the need for legislation as (1) The District of Columbia has been a terrorist target in the past and will continue to be a target in the future and (2) since the years following 9/11 no legislation has been taken to eliminate the threat to the district (Patterson, 2005).

The measures of the Act require re-routing of specific hazardous material around a 2.2 mile “Capital Exclusion Zone” surrounding the Capital Building. Of note is the fact that the Act regulates vehicles carrying, or those capable of containing, 4 of the 16 hazardous materials in 49 C.F.R. 173.2 (Patterson, 2005; STB 2005). The only hazardous materials, considered ultrahazardous materials, regulated by the act are: (1) Explosives, (2) Flammable Gasses, (3) Poisonous gasses, and (4) Poisonous materials, other than gasses. Even some of these ultrahazardous materials are exempt from the act. DOT Class C and D poisonous material and gasses are not subject to the ban; only class A and B gasses/materials, in a quantity of over 500 Kg, require re-routing. Additionally; flammable gasses, in quantities less than 10,000 liters, do not require re-routing. Finally only two of the 6 federal categories of explosives are covered by the ban, and only when those two categories are in amounts greater than 500 Kg. In further consideration of the economic impacts of this ban, the Act allows permits to be issued to allow these ultrahazardous materials to be routed through the Capital Exclusion Zone if “no other Practical Alternative Route” exists. With the exclusions identified above, the Councilmember estimated that the ban would re-quire re-routing of only 5% of the hazmat material currently being routed through the Capital (Patterson, 2005).

The AAR reports that Atlanta, Baltimore, Boston, Cleveland, Chicago, Cincinnati, Philadelphia, Pittsburgh, and the entire state of California are also looking to ban hazmat transportation (AAR, 2006; Johnson, 2005). New York City has gone as far as to legislate a restriction of hazmat rail operation into the city. Currently any hazmat material enters New York via truck (Kerstein, 2005). The proposed Baltimore law goes even beyond the New York legislation in that the Baltimore case wouldn't even allow trucks to bring these materials into Baltimore's "hazmat zone". This zone is defined as "all points within the geographic boundaries of Baltimore City" that can be shipped by "an alternative route" (Janis, 2005).

Although the rail industry states that it provides any hazmat movement information to local officials, upon request; city officials have refuted this statement. A spokesman for the Baltimore Mayors office said "the fire department requests the schedule of all hazardous-trains shipments, but it's been a struggle to get the information" (Janis, 2005). Indeed, the District Council Member Kathy Patterson, who authored the original D.C. law, stated that the law was needed due to the vagueness of DHS and CSX plans and states that CSX's voluntary rerouting was "temporary, secret, and unverifiable" (Johnson, 2005).

Government Reaction to D.C. Case

Although CSX won its appeal of the ruling to the Department of Transportation's Surface Transportation Board (STB), the STB is solely an economic regulatory body and therefore lacks authority to invalidate the law (Johnson, 2005). The STB can not invalidate the D.C. Act, but it can issue a declaratory order that the D.C. Act is preempted by the Commerce Clause. This declaratory order was issued by the STB on 14 March

2005. Furthermore, the STB stated that the case is “more properly addressed by the agencies that administer those statutes and by the federal district court” (STB, 2005). CSX is currently awaiting a federal court decision on this D.C. case (Quesada, 2005).

Supporters of the Washington D.C. ban state that public safety from terrorist activity should overrule any precedence based on the commerce clause. Even rail experts that doubt the law will withstand Constitutional scrutiny state that the government must develop an overall national policy concerning hazardous material transport through major cities (Johnson, 2005). The case puts the rail industry at the middle of debate between the federal government’s power to regulate interstate commerce and a city’s obligation to protect its citizens (Quesada, 2005). In its response to the Surface Transportation Board, the District wrote “CSXT’s interests cannot trump the District’s fundamental right and obligation to protect its citizens. The District of Columbia acts here in its most basic role ‘as a guardian and trustee for its people (Quesada, 2005). ’” Although industry does not believe this ordinance can withstand scrutiny of the Commerce Clause, the City Councilwoman Kathy Peterson states that she is confident that the ordinance would be upheld: “We were very mindful of the Commerce Clause (Quesada, 2005).”

50 mayors have petitioned the Department of Homeland Security (DHS) and the Department of Transportation (DOT) for advanced notification prior to hazmat rail transport through their cities and the Mayor of Washington D.C., Mayor Anthony A. Williams, presented the districts concerns to the National League of Cities in 2005 (D’Amico, 2005; Johnson, 2005). In response to a request by the San Francisco Mayor to provide some regulation to prevent Hazmat rail transportation through San Francisco, the California Representative Tom Lantos (D., CA) stated, “If we can stop TSA from

confiscating nail clippers and start disbursing security funds according to threats, we ought to be able to keep track clear of potential toxins by rail-and to keep them off the tracks where it counts,” (D’Amico, 2005). Adding to city concerns, Fred Millar, a consultant to the District of Columbia on hazardous shipment legislation, estimated that the DC case will be in litigation from 1 to 5 years. He urged American cities that

“I’m telling (other cities) that if they’re waiting to see what happens in D.C., it’s a strategy for doing nothing. We don’t want to be having this discussion a day after terrorists blow up a tank car and 30,000 people are dead. It’s like saying we’re going to fix the levees a day after Katrina” (Gallagher, 2005).

Industry Reaction to D.C. Case

CSX has won a declaratory order from the STB and is currently awaiting an appeal in the federal courts on several reasons. CSX has argued that the D.C. law unconstitutionally puts restrictions on interstate shipments and is therefore preempted by the Interstate Commerce Commission Termination Act and violates the Federal Railroad Safety Act and the Hazardous Materials Transportation Act (Quesada, 2005).

Furthermore, the CSX Petition to the STB states that CSXT developed specific hazmat security plans in coordination with FRA and TSA. They also argued that the FRA and TSA “approved” this plan. CSXT further argued that TSA completed a vulnerability assessment of CSXT’s routes through D.C. and CSXT’s hazmat procedures with said routes in 2004. This assessment did not recommend rerouting of materials around the Capital (STB, 2005).

The AAR is opposed to any effort to further restrict hazmat transportation, ban hazmat movement through particular jurisdictions, and enforce pre-notification of hazmat movement through particular areas. It is AAR’s position that any such restrictions would

damage the United State's economic well-being (AAR, 2006). Edward Hamberger, AAR President, told the Senate Commerce Committee during an October 2005 hearing that "Banning hazmat shipments in even one city would be problematic; banning them in cities throughout the country would cause immense confusion and economic disruption nationwide and would virtually shut down hazmat shipments by rail in this country" (Struglinski, 2005; UTU, 2005). Norman Mineta's, the Secretary of Transportation, comment "What we don't want is for our checkpoints to become chokepoints" further underscores the AAR's position that any regulation must weigh the costs and benefits of hazmat security with the necessity of the free flow of goods (AAR, 2006). The American Chemistry Council states that it has paid the railroads over \$5 billion in revenues each year to transport the over 3,700 hazmat rail shipments considered essential to its business (Johnson, 2005). CSX states that none of the shipments through the Capital originate or terminate in D.C. and that rerouting hazmat rail cars around the Capital would effect over 11,400 tank car shipments per year (Johnson, 2005).

The AAR rationale against the ban can be broken into two broad categories: risk-transference and pre-notification complications. Included in the issues with risk-transference is

- (1) the fear that multiple jurisdictions will ban movement
- (2) bans will force the use of less safe, secure, or efficient routes
- (3) and risk is simply shifted, not eliminated.

The AAR cites four issues with pre-notification:

- (1) industry already notifies communities upon request
- (2) carloads can not follow a rigid, predetermined route

(3) terrorists could garner sensitive information from hazmat location information, and finally

(4) communities already have access to this information, upon request (AAR, 2006)

Experts disagree with the extent of rerouting required due to major city bans. CSX states that the D.C. restriction would affect per year--10,500 loaded and empty shipments, add 2 million car miles, and add an additional 6,500 car handlings (Johnson, 2005; Quesada, 2005). CSX states that the nearest north-south line available for rerouting around D.C. is west of the Appalachian Mountains, through Tennessee, Kentucky and Ohio; while the closest east-west line goes from New York to north of Cleveland and from Richmond VA, to south of Charleston WV (Quesada, 2005). However; Rick Hind, legislative director for the Greenpeace Toxics Campaign, states that "CSX says they need to go thousands of miles away. That's not true. It would be child's play to facilitate the exchange of the equal number of cars between railroads. We're talking about a few cars a day (Quesada, 2005)." The "railroad swap" discussed by Hind is with neighboring railroad Norfolk Southern, which has nearby lines outside of the capital exclusion zone. In her introduction to the Terrorism Prevention in Hazardous Materials Transportation Emergency Act of 2005, Councilwoman Patterson also stated that CSX could simply avoid the Capital Exclusion Zone by using the Norfolk Southern line 50 miles west of the District (Patterson, 2005). However, it is unclear if Norfolk Southern would allow CSX to use the Norfolk Southern tracks, or at what cost. Furthermore; Theodore S. Glickman, a professor of business at George Washington University and rail routing consultant to

the AAR, found alternate routes for CSX around the Capital that reduced population exposure by 10 percent and cut miles by 1 percent (Johnson, 2005).

Another potential re-routing problem is that hazmat cargo re-routes could send hazmat rail through other cities with bans. CSX stated that to reroute around Baltimore City would take over 1,000 miles around Buffalo, Cleveland, and Pittsburgh (Janis, 2005). However, as indicated above, Cleveland and Pittsburgh are also pursuing bans. The Cleveland State University Geology Department in coordination with the Environmental Health Watch is currently looking for new routes for trains carrying hazardous material through Cleveland. They estimate that over half the trains that pass through Cleveland carry hazmat past facilities like the FBI building, the Justice Center, the water intake system, and the Brown's Football stadium (Nochta, 2005).

Summary

The transportation network has become increasingly important to any industry in the United States, especially those that have established a Just-in-Time supply chain manufacturing philosophy. As such, the rail industry's ability to move material, including hazardous material is paramount to the success of our industrial base. In the post-911 climate the United States Congress has taken little legislative steps to ensure the safety of citizen's living around these rail distribution centers. In fact, with HM-223, the Congress has taken a step back from legislation and has taken a philosophy of responsibility shuffling. The rail industry has taken steps to preclude the regulation of rail from becoming a piecemealed, State-by-State, activity. However, it is not know to what extent the 911 attacks, the Washington DC re-routing case, or the new HM-223 case

changed the legislative environment in this country. Research needs to be accomplished to see the legislative effects of these three incidents.

III. METHODOLOGY

Problem Statement

By identifying the differences since September 11 2001, as well as exploring to what extent the cities are increasing their roles in hazardous transportation regulation policies; this research seeks to assist those personnel in achieving their supply chain and transportation objectives. This research will use a meta-analysis approach combined with case study analysis by State.

Investigative Questions

The data collected through this research will be used to answer the following questions:

- (1) Has there been increased regulation regarding the transportation of hazardous materials by rail since 9/11?
- (2) Has there been increased regulation regarding the transportation of hazardous by rail materials as a result of HM-223?
- (3) Has there been increased regulation regarding the transportation of hazardous materials by rail as a result of the “The Terrorism Prevention in Hazardous Materials Transportation Emergency Act of 2005,” enacted by the District of Columbia?

Research Design

The first step for this research project was to decide which 10 Cities on which to focus out attention. The researchers decided to first pick 10 states, and then choose one city in each state. The research team decided to look at those States in which the most

HAZMAT material either originated or terminated. The HAZMAT originated/terminating data was garnered from the AAR database, see Table 1.

Table 1. HAZMAT movement data, 2004

ORIGINATION			TERMINATION	
STATE	TONS		STATE	TONS
Texas	41,179,819		Texas	21,583,044
Louisiana	21,654,124		Illinois	15,210,633
Florida	12,681,182		California	11,547,513
Wyoming	11,469,294		Florida	10,266,745
Illinois	10,045,815		Louisiana	7,987,085
Alabama	4,282,340		Ohio	7,651,767
Ohio	3,897,792		Georgia	7,330,768
California	3,770,158		North Carolina	6,238,364
North Carolina	3,566,679		South Carolina	6,014,248
Utah	3,448,572		Oregon	5,990,899
All Others	48,041,965		All Others	79,352,843

The researchers decided to include those States that were on both the origination/termination listings. This included Texas, Louisiana, Florida, Illinois, Ohio, California, and North Carolina. However, due to the ongoing recovery efforts from the Hurricane Katrina disaster Louisiana was not included (O'Brien, 2005).

For those States on either the origination or the termination listing, the team decided to narrow the search based those States in the HAZMAT corridors in accordance with Captain David Pastika's research (see Figure 1). Although Capt. Pastika's research centered around the trucking mode of transportation, the research team made an assumption that an area with more HAZMAT incidences, regardless of mode, would be more litigious across all modes (Pacticka, 2006). This research identified Utah, Arizona, Tennessee, Illinois, Maryland, and Ohio as those States with the most HAZMAT incidences. As such; the research team added Utah and Maryland to the study's listing of States. The research indicated that few Class I rail lines travel through Arizona (see

Figure 2) so Arizona was eliminated from the Study's database. Although Wyoming, South Carolina, and Oregon are on either the origination or termination listing; research showed few Class 1 rail lines travel through these States (see Figure 2); so they were also eliminated. Many class 1 rail lines move through Alabama and Georgia. Although Alabama is on the origination listing and Georgia is on the termination listing, the research team decided to pick only one, due to their proximity and the fact that most rail lines that are in Georgia are also in Alabama. Since Capt Pastika's research showed that more incidents happen in Georgia, the team chose Georgia over Alabama. Finally due to the concentration of Class 1 lines through Missouri, the research team decided to add it to the study's listing of States. To summarize, the following States were included in this study: Texas, Florida, Illinois, Ohio, California, North Carolina, Utah, Maryland, Georgia, and Missouri. Of note, the team eliminated Tennessee (a high incident state) from our research since the research already identified several States in the Southern region of the United States.

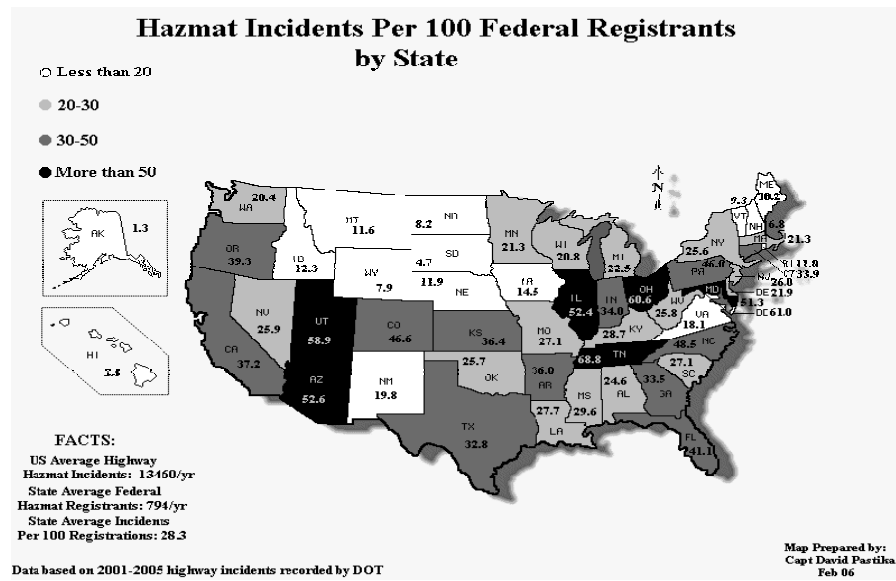


Figure 1. Hazmat Incidents By State

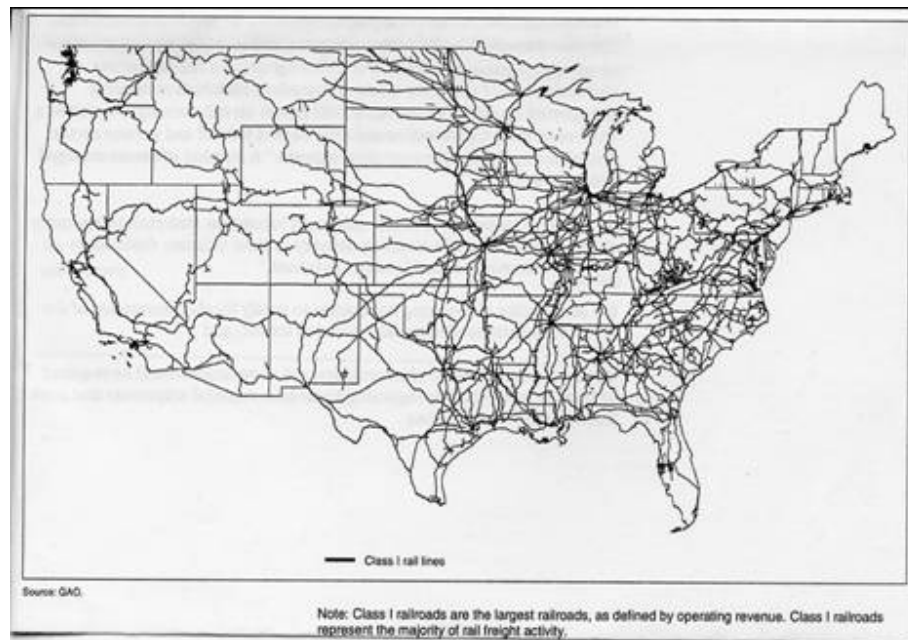


Figure 2. Major Rail Lines in the U.S.A.

The next step in this research was to choose the cities in the above States to include in this research. The research team used an online database to search those metropolitan areas with large concentrations of rail lines (Dex-online, 2006). Although Dallas had more rail lines than Houston, the team decided to use Houston since it was a major port city in Texas. The search showed 19 railroads in Jacksonville, Florida. Also since Jacksonville was the headquarters for CSX, so the research team decided that Jacksonville would represent Florida. Since Chicago had the most rail lines in Illinois it was decided that Chicago would represent Illinois. Since the team's research showed that many rail lines could be re-routed from Washington D. C. to Cleveland, it was decided to use Cleveland to represent Ohio. The search also showed that Los Angeles had more rail lines than San Francisco so it was decided that Los Angeles would represent California. The search further showed that there were more rail lines in Raleigh than Charlotte so it was decided that Raleigh would represent North Carolina. Figure 3 showed that most Class I rail lines in Utah ran through Salt Lake City Utah, so Salt Lake City was included to represent Utah. Since this issue started in Washington D.C., the team decided to use it to represent Maryland. Atlanta was chosen to represent Georgia, as dexonline.com showed it had the most rail lines of any other city in Georgia. Finally, since St. Louis was a major junction for Class 1 rail lines (see figure 3) the team decided that St. Louis would represent Missouri.

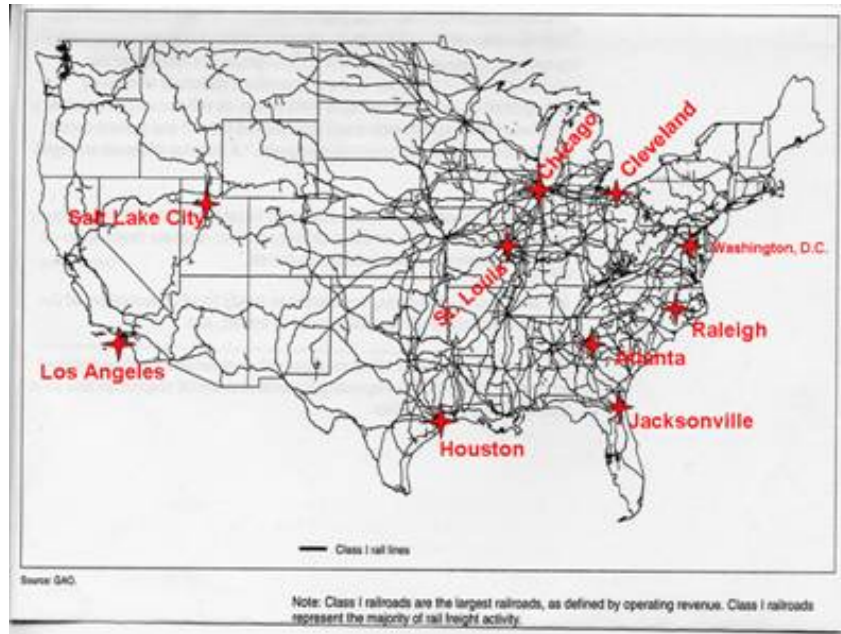


Figure 3. Cities to be used in Research

Summary

To facilitate data collection on the Investigative Questions, the team decided to send the questionnaire shown in Attachment 1 to each of the cities. City websites would be used to find the point of contact (POC) for each city in charge of HAZMAT policy. Once the HAZMAT policy POC was identified, the research team would send the questionnaire via e-mail. Should city websites not contain HAZMAT policy POCs, the researchers would contact city PR personnel via telephone to identify appropriate personnel to whom the questionnaire would be sent. Follow-up questions, if needed, would be done via telephone interview.

IV. Analysis and Results

Chapter Overview

This chapter offers an analysis of the data gathered through literature review, interview, and other collection methods as part of the case study. This analysis shows the frustration in trying to locate a municipal hazardous materials policy point of contact, and the subsequent struggle in attempting to find any consistent office responsible for hazardous materials at the cities selected. This is accomplished by showing each of the cities contacted and the efforts required to obtain a point of contact to solicit the required information. Once it became apparent that the cities would not provide any pertinent data, the research team then focused on the major railroads as a potential data source at the suggestion of Dr. John C. Spsychalski, Professor of Supply Chain Management at Penn State University (Spsychalski, 2006). A further analysis consists of the methodology associated with selecting the railroad companies and the research teams efforts to contact them is also included.

City of Raleigh, North Carolina

The team first attempted to locate a municipal hazardous materials policy point of contact as described in our methodology by searching on the City of Raleigh web page (Raleigh, 2006). Since no central hazardous materials policy point of contact was discovered after a comprehensive search of the web page, the team performed a search through the city page in an attempt to locate any potential source of information on hazardous materials. The resulting search proved partially successful, as it pointed us in the direction of the fire department as a potential source of information. Upon searching the Raleigh Fire Department web page, the team discovered that the Fire Training

division had an office for Hazmat/Environmental Assessment information, and as a result, the questionnaire was sent to the assistant fire chief in the fire training division. However, we received no feedback from the fire training division or an answer to any of the questions we posed on the questionnaire (see figure 4).

City Questionnaire
1. Have you increased regulation of hazardous materials transportation since 9/11?
2. If so, can you tell me what was changed and where I could get a copy?
3. Have you increased regulation of hazardous materials transportation as a result of HM-223?
4. If so, can you tell me what was changed and where I could get a copy?
5. Are you familiar with the Washington DC/CSX re-routing case?
6. Have you enacted any further regulation or are you contemplating further regulation as a result of the DC case?
7. If so, can you tell me what you have changed or plan to change and where I could get access to this information?

Figure 4. Questionnaire Sent to Cities Regarding Hazmat Regulation

City of Houston, Texas

The city of Houston also has no specific hazardous materials policy point of contact. When the research team performed a search of the cities web page it pointed in the direction of the Houston Office of Emergency Management and the fire department (Houston, 2006). After further research, there was no HAZMAT point of contact for the office of emergency management, but they have a liaison with the fire department through the department's homeland security division. After searching through the fire

department's page, we located the homeland security division and found that the special operations section is responsible for HAZMAT. The team then sent the questionnaire to both the fire departments public information office and the special operations section. The research team received no feedback or any information from either the department's public information office or the special operations section.

City of Atlanta, Georgia

In contrast to our methodology, the research team found that the city of Atlanta had no distinct point of contact for hazardous material policy. A search of the cities web page revealed hazardous materials links to the fire department (Atlanta, 2006). A thorough search of the fire department's web page revealed that the operations division is responsible for hazardous materials, homeland security response and planning. The department had an officer assigned as a public information point of contact, and questionnaire was sent to his office. The research team received no feedback or any information from the public information officer regarding the questions posed on the questionnaire.

City of Jacksonville, Florida

An exhaustive search of the Jacksonville city web page revealed no established point of contact for hazardous material policy point of contact (Jacksonville, 2006). After performing a search query on the web site, the team was again shown links to the fire department. Researching the cities web page revealed further that an emergency preparedness office has been established under the fire department. Upon reaching the fire departments page it was found that the emergency preparedness office is responsible for hazardous materials incidents as well as response to possible terrorist incidents. A

questionnaire was sent to the public information office and the emergency preparedness office requesting information. The team received no feedback or information regarding the questions posed on the questionnaire from either the public information or the emergency preparedness offices.

City of St. Louis, Missouri

A search of the St. Louis web page failed to reveal a distinct point of contact for hazardous material policy (St Louis, 2006). After performing a search request on the cities page, the team was surprised to only discover a link to the cities Emergency management agency. Given the consecutive cities that have pointed the team in the direction of the fire department, a search was still performed of their division. This search revealed that there are neither points of contact for hazardous material nor any mention of hazardous materials. As a result the team sent the questionnaire directly to the city office of emergency management, and received no feedback or information from them regarding the questions posed.

City of Los Angeles, California

The Los Angeles city web page also failed to show proof of a distinct hazardous material policy point of contact (Los Angeles, 2006). After performing a search query on the web page it was not clear who was responsible for hazardous materials, as the team discovered links to a county office of emergency management, the fire department, the California highway patrol (CHP), and the Los Angeles police department (LAPD). Extensive research revealed that the emergency management office has no separate hazardous materials section, as they only deal with emergency preparedness. Furthermore, the team also found that the fire department has a manager of hazardous

material programs but the LAPD and the CHP are responsible for the bio-terrorism response depending on the location of the incident. While no response was received regarding the questions posed, the fire department was quick to point out that it was the LAPD/CHP's job to respond to incidents on the streets and not theirs.

City of Chicago, Illinois

After a rigorous a rigorous search of the Chicago city web page no point of contact was found that represented a single hazardous materials policy perspective (Chicago, 2006). A query into the web page itself once again revealed a familiar link to the fire department. After searching through the fire departments section, the team made the discovery that the operations division has control of the hazardous incident response team through their special operations section. It is worth noting that Chicago's hazardous materials unit is trained to deal with weapons of mass destruction, and bio-terrorism. Furthermore, their site explains that they are involved in the formulation of department hazardous material policies in conjunction with city, state and federal agencies. The questionnaire was sent to the public information/public affairs contact, as it was the only address available. The team received no feedback or information from the fire department regarding the questionnaire.

City of Salt Lake City, Utah

Once again, a thorough search of the Salt Lake City Web page failed to reveal a single point of contact responsible for hazardous material policy (Salt Lake City, 2006). A further search of the web site led the team to links to both the cities emergency preparedness office and the fire department. Investigation showed that the emergency preparedness office was mainly concerned with disaster

preparation, and made no mention of hazardous materials policy of response, while the fire department had a hazardous materials section under the fire prevention division. As a result, the questionnaire was sent to the fire preventions sections fire marshal, and the public information office. To repeat a recurring trend, the team received no feedback or information from anyone at the fire department regarding the questions posed on the questionnaire.

Cities of Cleveland, Ohio and Washington D.C.

The research team elected to not send these cities questionnaires as the main intent was to assess the potential for municipal hazardous material restrictions via re-routing or other methods (Washington DC, 2006). As both of these cities have already enacted legislation or have indicated they will in the future, the team felt that that data had already essentially been collected, when they made their preferences known (Cleveland, 2006)

A change in methodology

As it became apparent that the city hazardous material points of contact would not respond to the questionnaire, and were probably not organized to answer the types of questions the team was asking, a change in approach was needed. At the request of our advisor, the research team contacted Dr. John C. Sychalski, Professor of Supply Chain Management at Penn State University to recommend a new direction (Sychalski, 2006). Dr. Sychalski corroborated our finding when he mentioned that the only cities likely to respond would be the municipalities that have either already enacted legislation, or have indicated their willingness to do so. As a result of that impasse, he recommended that the

team attempt to contact the railroads, and made a further recommendation that it be done through their government contact division if possible.

This change in direction necessitated a new methodology to contact the railroads that operated in the states selected for research. The research team again made use of the American Association of Railroads (AAR) web page (<http://www.aar.org>), and selected the breakdown of rail service offered in each state. This breakdown consisted of separate data sheets for each state and included the miles of railroads operated by all railroad companies. This allowed the team to identify the Class I railroads that operated the majority of the track in that state as a contact point for information that state and city. This information illustrated that four major Class I railroads operate the majority of track in all ten locations, as can be seen in Table 2.

Table 2. State railroad contact list

STATE	CLASS I RAILROADS
Texas	Union Pacific Railroad, BNSF Railway Company
Illinois	Union Pacific Railroad, BNSF Railway, CSX Transportation
California	Union Pacific Railroad, BNSF Railway Company
Florida	CSX Transportation
Ohio	Norfolk Southern Corporation, CSX Transportation
North Carolina	Norfolk Southern Corporation, CSX Transportation
Georgia	Norfolk Southern Corporation, CSX Transportation
Utah	Union Pacific Railroad, BNSF Railway Company
Missouri	Union Pacific Railroad, BNSF Railway Company
District of Columbia	Norfolk Southern Corporation, CSX Transportation

The research teams previous experience with the cities also resulted in a slight change in contact methodology. The team's first attempt at communication would be through the phone in an attempt to establish a rapport, and then follow up with an e-mailed questionnaire. Following the advice of Dr. Spychalski, the team then attempted to locate a government point of contact for each of the Class I railroads in order to submit a questionnaire for the railroads (see figure 5). Finally, the teams initial research of the railroads revealed that only BNSF and Union Pacific had a government affairs division, and CSX and Norfolk Southern would have to be reached through different means

Rail Company Questionnaire

1. Have you seen increased municipal regulation since 9/11 by the nine cities listed below?
2. What are the increased regulations that you mention, where can I get a copy of them?
3. Are you aware of any cities contemplating further regulation as a result of the Washington DC case?
4. If so, can you tell me what cities are contemplating further regulation, and what that regulation may entail?

Cities in Question:

Houston, TX
Chicago, IL
Los Angeles, CA
Jacksonville, FL
Cleveland, OH
Raleigh, NC
Atlanta, GA
Salt Lake City, UT
St Louis, MO

Figure 5. Questionnaire Sent to Rail Companies Regarding Hazmat Regulation

Norfolk Southern Corporation

After searching through the company web page (Norfolk Southern Railroad, 2006), the only contact information available was the media contact division. The company had media contact inquiries broken down by states and regions of the country, in addition to a separate contact section for inquiries related to corporate operations and law. As our research is dealing directly with the effects of laws since 9/11 and the potential effects of further regulation, this is the section the research team decided to contact.

After leaving many voice mails, the team was finally able to establish contact via the phone and was immediately told to contact a different person. The only problem was this person was not in the section regarding law inquiries, and was simply a standard regional point of contact. Refusing to be deterred, the team attempted to initiate contact with the individual. After repeated attempts to contact this individual by phone, the team finally sent the questionnaire to that individual along with the teams contact information, and followed up with a voice mail asking for his assistance. Unfortunately, the team failed to receive any feedback or information regarding the questionnaire sent to Norfolk Southern (NS Media Relations, 2006).

Burlington Northern Santa Fe Railway

A search of the BNSF web page (BNSF Railroad, 2006), revealed a government affairs section hidden within the communities section. The government affairs section was broken down by regional points of contact, as well as a headquarters for the entire division. Given that the study and questionnaire crossed most regional lines the research team elected to contact the headquarters in order to get a focused company perspective. Unfortunately, after weeks of attempts and many voice mails left, the team was unable to establish contact via the phone and had to settle for simply sending them the questionnaire. No feedback or information regarding the questions posed was received from BNSF (BNSF Government Affairs, 2006).

CSX Transportation

The CSX web site (CSX Transportation, 2006), had a banner for the media that led to their contact page. There was an immediate difference with this media section, as while they had contact personnel broken down into regions, there was only one number

to call for the majority of the regions. In addition, they had a separate page labeled industry issues, which stated their position regarding the shipment of hazardous materials, and railroad security (CSX Transportation, 2006) . Given that CSX has led the fight against the Washington D.C. re-routing case, this did not come as a surprise, but was the first railroad to publicly state their views. After seeing this in such a public forum, the research team began to think that this would lead to a company willing to answer our questionnaire.

After contacting the office, the team found out that the number was simply a central answering service, where they assign a number to your request and allocate it to the correct region (CSX Media Relations, 2006). After initially telling the team that they would respond with in five days, it took the teams continued calling to coax a response from CSX. In the end while the team never did receive an answer to the questionnaire, CSX sent a letter concerning the shipment of hazardous materials. Unfortunately this letter only reminded us of their common carrier obligations, and offered no insight into the potential for increased regulation. The only relevant passage in the letter simply stated, “As of the date of this letter, courts and public policymakers are debating the issue of re-routing hazardous materials. Until our common carrier obligation in this area is lifted, we will continue to move hazardous materials in the safest manner possible.” While this was the team’s first serious response, it was not the data that the team was hoping to collect.

Union Pacific Railroad

A search on Union Pacific’s web site (Union Pacific Railroad, 2006), shows a media contact banner and a government affairs office link on the media contact web

page. Similar to most of other railroads, their media section was broken down by regional point of contact. After the lack of response by railroads, the team elected to attempt to contact both the media contact for the Houston region, while simultaneously contacting the director of government affairs. This was done to see if any salient data could be collected in the last attempt to contact the Class I railroads.

The team established phone contact with the media contact and was asked to send the questionnaire. The research team also was able to establish phone contact with the government affairs director, who initially offered to assist in attempting to ascertain who in the company could answer the questionnaire. Unfortunately, a week later the team was contacted by the regional media contact, which recommended the team contact the American Association of Railroads (AAR), as the research topic cut across the entire railroad industry. When the team attempted to contact the government affairs director to ensure this was the recommended course of action, the team received contact that he could no longer help and to contact the AAR (UP Government Affairs, 2006).

American Association of Railroads

At the direction of Union Pacific, the team eventually was able to establish contact with the AAR, and sent the questionnaire per their request (AAR, 2006). The initial phone conversation stating the basics of the situation seemed very promising as they offered a very holistic perspective, one far different than the team had heard to date (AAR Media Relations, 2006). However, that was the last contact the team was to make with the AAR, as they have yet to send feedback, or information regarding the questionnaire, despite their assurance they would do so.

Summary

In this chapter the research team showed the frustration in trying to locate municipal hazardous materials policy points of contact, and the subsequent struggle to find any consistent office responsible for hazardous materials at the any of the cities. This combined with a total lack of response from either the railroads or the cities left the team without any city level data. This was unfortunate, as the team had hoped this data would allow for the ability to provide new knowledge into this unexplored topic. As a result, in the next chapter the research team attempts to answer the investigative questions and the research question based on the literature review and our new found insight to the industry.

V. Conclusions and Recommendations

Chapter Overview

This chapter summarizes the research effort. It presents conclusions based on a meta-analysis of the literature review to answer the investigative and research questions. It also states the research team's recommendations for a more coherent city hazardous material program and policy management application, and concludes with the teams recommendations for future, related research.

Research Summary

This research was conducted in an attempt to provide new information on a fledgling academic topic by answering the question: has the current terrorist environment increased regulatory issues with regard to hazardous materials transportation via rail? In an effort to guide the research, this research question was supported by three investigative questions. The first investigative question established the effects felt due to the current terrorist environment after 9/11. The second question sought to attain the effects of the Department of Transportations efforts to relax its federally mandated regulation of hazardous materials. The third investigative question represented the heart of the research by evaluating the potential for other cities to enact similar mandatory re-routing regulation around their municipalities.

The research and investigative questions were answered through both a meta-analysis and a case study methodology. The literature review covered the current security environment, an overview or recent rail accidents, and concluded with a review of HM-223 and the Washington DC case and the resulting industry and government

reaction. This allowed for the team to apply the meta-analysis technique to answer the research and investigative questions through the literature review. In addition, while the case study methodology did not result in any direct data, the team gained new insight into the rail industry and city concerns during the many hours spent trying to solicit data from the city and rail points of contact. This insight allowed the team to conceptualize the potential for the future of the industry, and make recommendations for city policy plans and future research.

Research Conclusions and Recommendations

The first Investigative question was designed to determine if the Department of Transportation of the Department of Homeland Security had increased the security requirements for HAZMAT rail transportation due to the terrorist attacks of 11 September 2001. Although the research team did not obtain any data from the field on the nine cities in question, the literature available has provided some insight into this question. The GAO reports concerning Hazmat transportation and rail security all state that there has been no increased regulation from DOT or DHS due to the 9/11 attacks. In the original congressional statement on the introduction of her bill, Councilmember Patterson specifically called attention to the fact that there had been no legislation to increase rail security since the September 11 attacks. The AAR has noted that the industry has voluntarily increased security measures, but there has been no governmental response in regards to rail HAZMAT movement. With such information, the research team has determined the following finding: There has been limited to no governmental reaction in regards to HAZMAT rail transportation since the September 11, 2001 attacks.

The researchers agree with the GAO 2003 report which stated that the Government needs a comprehensive transportation security policy. As such HAZMAT rail transportation is a nation-wide issue and should be addressed in a cohesive, complete nation-wide manner.

The second investigative question was an attempt to ascertain the effects of a legislative gap created by HM-223. This DOT regulation left a gap in transportation policy once a carrier left the unloading destination facility. Industry fears that this gap will lead to an overabundance of state-by-state legislation. Due to the fact that the research team did not receive any feedback from the field and the fact that the regulation is new and currently being contested; the researchers could not come to a verifiable finding regarding the effects of HM-223 on the rail industry. Although the rail industry is extremely concerned with the effects of this new policy, it is too soon to see if a legislative backlash will occur throughout the States.

The final investigative question was designed to see if individual cities are planning to follow The Capital's HAZMAT rerouting policies. This legislation is also new and is currently being contested in the courts. Due to the fact that the field research failed to gain data, the research team must use information from the review of the literature.

The effects of the D.C. case remain contested. Although the rail industry states that rerouting would require millions of additional rail miles, other industry and government experts state that the rerouting of HAZMAT around major cities would not require much effort. The Government and the rail industry are also at odds concerning advance notification of HAZMAT rail movement. Although the rail industry states that this information is already readily available, city officials have stated that this

information is difficult if not impossible to gain in a timely manner. Whether this is due to the fact that this information is difficult for the rail industry to obtain or is due to industry stonewalling is unknown.

It is clear to the research team that other cities will follow D.C.'s example with respect to restrictive HAZMAT legislation. Although most cities appear to be waiting to see how the appeal courts rule in respect to this case, many major cities in the United States have already started to enact legislation restricting HAZMAT movement through their areas. Review of the current literature showed that the entire state of California, Atlanta, Boston, Cleveland, Chicago, Cincinnati, Philadelphia, and Pittsburgh are currently looking into HAZMAT restrictive legislation. New York City has restricted any HAZMAT rail traffic into the City. Baltimore has tried for the most restrictive legislation in that both rail and truck traffic is restricted in the City. It is clear to the team that should the courts uphold the D.C. ruling many other cities will follow D.C.'s example. It is the team's opinion that these restrictive legislation will adversely affect the rail movement of hazardous material.

An unforeseen aspect of this research was the difficulties received in discussing HAZMAT policy with individual cities. Although the research team originally anticipated the ability to go directly to the HAZMAT policy office of any cities in question, this was not the case. In almost every case, the team had immense difficulty finding anyone available to discuss HAZMAT policy. In most cities, the fire department became the "de facto" HAZMAT policy office due to the fact that the fire department was in charge of training for HAZMAT response. It was the research teams' opinion that

this showed the cities' reactive nature to HAZMAT issues. The team assumed that the cities' would have a more proactive stance toward HAZMAT policy, but this was not the case. Therefore, the team developed the following finding: Most cities had reactive policies toward HAZMAT incidences and a central office may be needed.

In conclusion, the research team developed the following findings:

- (1) There has been limited to no governmental reaction in regards to HAZMAT rail transportation since the September 11, 2001 attacks.
- (2) The effects of HM-223 on the rail industry are undetermined.
- (3) The restrictive legislation in response to the D. C. case will adversely affect the rail movement of hazardous material throughout the country.
- (4) Most cities had reactive policies toward HAZMAT incidences.

Areas for Future Research

It was the opinion of the research team that the field was hesitant to respond to our questions due to the fact that the issues are currently being contested in the courts. It would prove beneficial to repeat this research methodology after the D.C. court case is resolved. It would also be beneficial to limit the research to one or two cities. The ability to delve deeply into a city's policy, to determine how and why the legislation was enacted, would also prove beneficial. It could also prove beneficial to take an in depth look at the number of national HAZMAT regulations and policies prior to September 11, 2001 and after. Once the number of regulations is established, the researcher can look to see what changes have occurred.

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through this study allowed the research team to discover the following findings: there has been limited governmental reaction to terrorism within the rail regulations; the effects of HM-223 are undetermined; the Washington D.C. case, if upheld, will adversely affect the rail industry; and most cities have reactive policies toward HAZMAT rail movement.

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